

## ABSTRACT

A three terminal edge illuminated epilayer waveguide phototransistor including a subcollector layer formed of an epitaxially grown quaternary semiconductor material, such as heavily doped InGaAsP. A collector region of undoped InGaAs is epitaxially grown on the subcollector layer. A base region, including a heavily doped InGaAs base layer and a very thin undoped InGaAs spacer layer, is epitaxially grown on the collector layer. An emitter region, including a doped InGaAsP layer, a doped InP layer, and a heavily doped InGaAs emitter contact layer, is epitaxially grown on the base layer. The various layers and regions are formed so as to define an edge-illuminated facet for receiving incident light.